

In the intermediate energy range (100-500 MeV) the pion interaction is dominated by the very strong  $\Delta$  resonance.

$\Delta$  resonance peaks for pion kinetic energy of  $\sim 200$  MeV

At 200 MeV for carbon iron cross section distribution is:

Elastic:	35%	40%	(214 700 mb)
Inelastic:	33%	20%	(210 360 mb)
Absorption:	25%	35%	(160 600 mb)
CEX	7%	5%	(45 83 mb)
DCX	always negligible		

(these are not neutrino cross sections!)